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Modern Chemical Technologies in the Production of Textile

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Annotation: The production of textiles and products from it (clothes, shoes, hats, household items) is one of the most ancient technologies, along with medicine, agriculture, cooking technology, house building. These technologies are for all time, their results are vital and in demand by everyone every day.

Keywords: modern technologies, textile production, fabrics, knitwear, chemical transformations.

Introduction. Like many of these ancient and modern technologies, textile production has gone through the traditional stages of development: art - craft - technology [1]. Therefore, these exclusively peaceful areas of human knowledge and practical activity developed and improved synchronously with the development of civilization and, above all, the fundamental and applied sciences, implementing their ideas and methods quickly and efficiently. For all these technologies, chemistry has always played and will continue to play an extremely important, dominant role [2].

The production of textiles consists of two very different stages in their essence: mechanical and chemical technologies. At the first, mechanical technological phase, the production of yarn from natural or chemical fibers (spinning) is carried out, from which fabrics are then made (weaving). Virtually no chemical transformations occur with fibers, yarn and fabric at this stage. The connection with chemistry lies only in the fact that all textile fibers (natural, chemical) are various polymers with a certain chemical structure and physical structure. Therefore, to implement the mechanical stage of the technology, extensive knowledge of the physical and mechanical properties of fibers, which are determined by their chemical and physical nature, is required [3, 4].

The chemical technology of textile materials as an object of influence deals with a harsh fabric (rarely yarn), knitwear or non-woven material. This is not the final product yet, it has a long way to go, including a large number of operations of physical and chemical action or chemical transformations [5, 6].

The main stages of the chemical technology of textile materials (finishing) are the cleaning of textile materials from contamination, coloring (dyeing and printing) and final finishing (sizing). Prominent chemists from different countries (Perkin, Zinin, Vorozhtsov, Ilyinsky, Korozers) took an active part in the development of the chemical technology of textile production, as a field of knowledge and applied activity [7]. This is understandable, since the production of textiles and products from it played a huge domestic, social, economic and political role on the long path of civilization development. The development of this technology characterized the level of culture, science, and the country's economy. Textiles were an important subject of trade between peoples, the reason for the opening of new trade routes (the Great Silk Road), one of the reasons for commercial and real wars (for example, between France and England at the beginning of the XIXth century). Currently, textiles are one of the most important subjects of an agreement within the framework of the World Trade Organization. And this is not accidental, since the income from the production and consumption of textiles since ancient times, as well as today and in the foreseeable future, is from 15 to 20% of the total revenues to the budget of large states.

The complex technology of textile production is based on numerous physical and chemical phenomena and chemical transformations, and almost all the main sections of chemistry are actively used in its theory and practice.

Preparation is the initial stage of technology. The preparation of textile materials, i.e. cleaning from contaminants and giving whiteness to textiles, is primarily based on colloid-chemical processes and, in particular, with the participation of surfactants, since the removal of contaminants is carried out through the emulsification of water-insoluble contaminants of a hydrophobic nature (fats , wax) using detergent emulsifying surfactants.

Colored contaminants (natural pigments) must be bleached to make the textile material white (destruction of the chromophore system of the pigment without destruction of the polymer base of the fiber), which is achieved by treatment with specially selected inorganic oxidizing agents (chlorites, hypochlorites, peroxides). This important part of the technology is based on inorganic chemistry (oxidizing agents), dye chemistry (color theory), physical chemistry (redox reactions), polymer chemistry (oxidative degradation of polymers), chemical physics (radical chain reactions of organic substances oxidation). The above enumeration does not exhaust the complete list of chemical and physico-chemical processes and phenomena inherent only in the first chemical-technological phase of textile production.

One of the operations of preparing (and not only preparing) textiles is to give the material a stable shape by heat treatment (steam, hot air, IR heating), which ensures the occurrence of relaxation processes that relieve local stresses in the material up to the supramolecular structure of the fiber. The material under these conditions passes into a thermodynamically equilibrium state. Consequently, in this operation we are dealing with the physics and physicochemistry of polymers.

Coloring, that is, the formation of color on a textile material entirely over its area (dyeing) or local, according to the artist's drawing, in a broad sense can be considered as the interaction of low molecular weight colored compounds (dyes or pigments) with a solid biporous (micro and macropores) dispersed polymeric textile material . As a rule, this interaction is carried out as a result of the mass transfer of a colored substance in the form of an ion or an uncharged molecule from the external environment (phase), most often liquid, less often gel-like or gas, into the solid phase of the fiber, followed by the penetration of the dye into the internal structure of the fiber and its fixation by sorption bonds. different nature (physical sorption or chemisorption). Such a complex interfacial, heterogeneous process includes diffusion and sorption as the main stages. Diffusion is the limiting stage that determines the rate of dyeing and printing processes, while sorption and its thermodynamic properties (affinity, heat, entropy) affect color stability.

Depending on the chemical and physical nature of the fibers and the chemical structure of dyes (belonging to a certain class), various mechanisms of diffusion and sorption of dyes appear.

In the case of non-thermoplastic hydrophilic fibers (cellulose, protein) with a developed structure of micropores, the diffusion of the dye is carried out through a liquid (water) that fills the micropores of these fibers - the pore mechanism - with simultaneous physical or chemical sorption of dye ions on the active centers (ionogenic groups) of the fiber.

Just as a new house without interior decoration and engineering communications is not suitable for habitation, so a harsh textile material only after finishing at the chemical stage of technology and its last stage - dressing becomes a finished textile material with a complex of consumer properties. Most textile materials used in everyday life and especially in technology are given wear resistance to certain types of destructive effects (mechano, thermo, chemo, photo, biodegradation). Most often, the material in the product experiences several destructive effects simultaneously.

In addition to the general requirement for textile materials - wear resistance, they are additionally subject to special requirements that take into account the specific purpose of the material: for clothing - dimensional stability; for bed linen - hydrophilicity; for raincoat materials - water repellency; for

overalls - oil repellency, reduced flammability; for tent fabrics and geotextiles - hydro and bioresistance.

Conclusions. The international name of all the processes and problems of the chemical technology for the production of textile materials has long "taken root" - "Textile chemistry". Books, textbooks, magazines are published under this name. Of course, there is no strictness in this name, and it would be better to replace the word “textile” with “textile” and say “Textile chemistry”. But it's too late - the term has firmly entered into use. Textile production and textile chemistry have existed for several thousand years, going through evolutionary and revolutionary stages. The former prevailed, rarely alternating with the latter. In addition, the classification of certain improvements and discoveries as evolutionary or revolutionary is subjective.

References

1. Перепелкин К. Е. Структура и свойства волокон. М.: Химия, 1985, 208 с.
2. Свойства и особенности переработки химических волокон. Под ред. А. Б. Пакшвера. М.: Химия, 1975, 496 с.
3. Перепелкин К. Е. Химическая энциклопедия. Т. 1. М.: Советская энциклопедия, 1988, с. 413-416.
4. Гусев В. Е. Химические волокна в текстильной промышленности. М.: Легкая индустрия, 1971, 408 с.
5. Мельников Б. Н., Захарова Т. Д. Современные способы заключительной отделки тканей из целлюлозных волокон. М.: Легкая индустрия, 1975, 208 с.
6. Абдукаримова М. З. «Толали материалларни пардозлаш кимёвий технологияси». Тошкент. Меҳнат 2004.
7. Ковтун Л. Г. «Химическая технология отделения трикотажных изделий». М. Легпромбытиздат, 1989 г.